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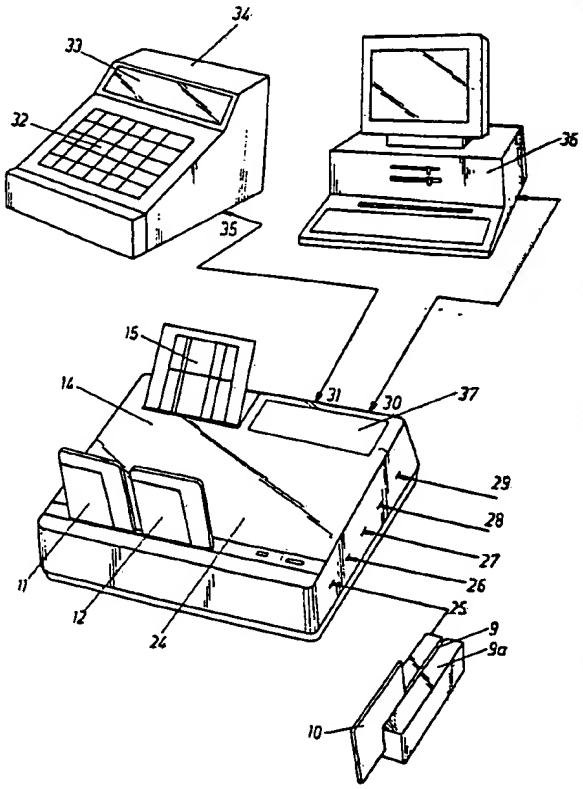
(54) Title: AN ELECTRONIC MEMORY UNIT AND A MAIN UNIT ADAPTED TO BE USED TOGETHER WITH THE MEMORY UNIT

(57) Abstract

An electronic memory unit (1, 11, 12) comprising a storage (2) containing information to be used to check credit cards (10) and similar cards tendered as a means of payment. The memory unit (1, 11, 12) is provided with a memory space (4, 12) in which are successively stored at one point of sale and over a predetermined period of time, for instance corresponding to one business day, all data pertaining to all transactions made by means of credit cards (10) during that day. The stored transaction data are electronically transferable from the memory unit (1, 11, 12) to a terminal (23) which is connected to a computer (19). A main unit (24) which is adapted to be used together with the electronic memory unit (1, 11, 12) is provided with inputs (25, 26, 27, 28, 31) to connect card readers (9a) and a terminal (34) equipped with a keyboard, a printer (14) for printing out credit card sales slips (15) containing said transaction data, and electronic means both for comparison of the read credit card accounts number against data on the credit cards in the information storage (2) and for successively entering data on the performed transactions into the memory space (4, 12).



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An Electronic Memory Unit and a Main Unit Adapted to be Used Together with the Memory Unit.

The subject invention concerns an electronic memory unit comprising a storage containing information to be used to check credit cards when the latter are being used as a means of payment.

From e.g. the Swedish Patent Application 8604600-0 is known an apparatus for checking the validity of credit cards and equivalent cards. The apparatus comprises a memory card which contains a ROM memory in which is stored coded information regarding which credit cards are invalid-status cards at any particular moment and consequently are invalid as a means of payment. By using electronic equipment the cashier or shopkeeper is able to check the information coded in the credit card tendered as payment, against the information contained in the memory card and thus rapidly establish whether or not the credit card is a valid means of payment. This makes the handling of credit cards in the stores a great deal easier compared with the use of a resctricted cards list, which has to be checked manually and which as a rule is of a considerable size.

Another method of foregoing the use of restricted cards list is to employ computerized credit card checks, a method which was introduced recently. By purchasing special terminal unit the individual storekeeper may be connected on-line to the main data bases of one or several credit card companies. For each credit card checking operation the terminal unit calls the main data base in question via the telephone network or, in some cases, via a directly connected line, to request information as to the validity of the credit card. When the calls are made via the telephone network it takes, under favourable circumstances, a minimum of 15 to 30 seconds to obtain a clearance signal via the terminal. This system does not either require that the storekeeper uses the above-mentioned memory card which, like the restricted cards lists, for economical reasons is distributed from the credit card central at intervals, for instance with a frequency of every other week.

One disadvantage which is connected with this on-line system is, however, that as the system expands to handle more credit cards quite a considerable increase of the number of lines connected to the central will be required in the future to ensure rapid connections to the central and avoid delays each time a credit card is being checked for validity. Consequently, the system will be expensive and it may even have to be oversized, since experience shows that purchases in shops and department stores are not evenly distributed over the business hours but instead tend to be more frequent during the lunch hour and after office hours. In addition, a system of this kind is entirely dependent on the reliability of the existing telephone network, which varies considerably from one country to the other. From a safety point of view it is not either entirely without risk to transmit confidential information over the public telephone network as such information could be intercepted or manipulated in various ways.

Customer-use of credit cards also imposes other tasks on the cashier or storekeeper. When the prices of the various items purchased by one customer are added at the cash-desk the cashier must use a printing machine - which may be of an individual design for each credit card concern - a credit card sales slip and a pen. In the printing machine a roller transfers the credit card number, the name of the credit card holder and the period of validity of the credit card from the credit card onto the sales slip. This operation is followed by the cashier writing, by hand on the slip, the nature of the purchases, the date, price including VAT as also the kind and the number of the customer's identification card. Finally, the customer has to acknowledge the transaction by signing the sales slip, whereupon the cashier, to whom the signed slip is returned, separates the two copies thereof, returning one copy to the customer while the cashier/storekeeper retains the other to be handed over to the bank or directly to the credit card company.

At the end of each day of business all credit card sales slips relating to the purchases made during that day are collected and mailed to the various credit card companies, or else a messenger takes them to the bank the services of which the store uses, and places the bundle of credit card sales slips in the service box of the bank or, if the bank is open, he hands it over to the bank clerk inside the bank. The employees

of the bank or the credit card company must then visually check all credit card sales slips thus received and transfer all information thereon manually into a computer. This manual work is often quite extensive and strenuous and the difficulties in deciphering the handwritten information in the form of letters and numbers may lead to errors as regards the amounts debited the customers. Not until the information has been fed into the computer does it become possible to process the information electronically to register the purchases to the proper accounts and to bill all customers who have paid by credit card. Finally, the storekeeper must receive payment for the purchases that have been made and every delay in this long chain of transactions in the payment by means of credit cards is expensive as it means loss of interest and other capital costs.

The subject invention provides an electronic memory terminal and a main unit. Together these two components form a complete electronic system for checking credit cards and for collecting information on electronic transactions. By means of this system the handling of credit card purchases and the checking thereof are greatly facilitated. The system in accordance with the invention including an electronic memory unit including a storage containing information for checking credit cards that are being used as means of payment. The invention is characterized therein that the memory unit also comprises a memory space in which are successively stored data on the transaction performed over a predetermined period of time by means of credit cards and also therein that the transaction data are electronically transferable from the memory unit to a terminal which is connected to a computer.

The invention also comprises a main unit which is adapted to be used together with the electronic memory unit. The main unit is characterized therein that it has one or several inputs to which are connected card reader means, one input to which is connected a terminal, such as a cashier terminal, the latter being equipped with a keyboard, a printer means for printing credit card sales slips on which are indicated the transactions made by means of credit cards, and electronic means to compare credit card account numbers read by the card reader means against data stored in the information storage of the memory unit as well as electronic means for successively entering data on the performed transactions into said memory space in the memory unit.

Further characteristics of the invention will appear from the following description and the appended claims.

The invention will be described in closer detail in the following with reference to the accompanying drawings, wherein

Fig. 1 is a diagrammatic view of an electronic memory unit in accordance with the invention in the form of a card,

Fig. 2 is a perspective view of one example of the equipment to be used in a shop or a store for handling credit cards by means of the electronic memory unit,

Fig. 3 is a block diagram of the handling system in which the electronic memory unit is used, and

Fig. 4 is a perspective view of a similar handling system incorporating the main unit in accordance with the invention,

The electronic memory unit in accordance with the invention is provided on a memory card 1 of a kind known per se. By "memory card" is to be understood in this connection a card having the same dimensions as the conventional credit card, viz. having a width of 54 mm, a length of 85 mm and a thickness of 2 to 3 mm and being equipped with connection/plug-in contacts along their edges. The card could be made from plastics or from sheet metal. It is a characteristic feature of the memory card 1 that it comprises a number of memory circuits which may be of different types, such as ROM, OTPROM, EPROM, EEPROM, FLASH-EPROM or SRAM. Memory cards of these types are available today from various chip manufacturers. The SRAM type is preferable for the reason that application of the information on the card and its eradication therefrom may be performed very rapidly. On this memory card 1 a first area 2 thereof is, in accordance with one embodiment, a storage in which is stored the data gathered from the latest list (or lists) of restricted account numbers, a second area 3 which is intended to indicate e.g. the types of credit cards which are accepted by the individual shopkeeper, and a third area 4 in which is stored data from all credit card sales slips over a predetermined period of time, such as one day of business, relating to the purchases made by means of credit cards in one shop. These transaction data are stored in the memory space 4.

Fig. 2 shows one example of possible equipment to be used by a storekeeper. A calculator 5 comprises a microprocessor and other electronic components which are already known and therefore need not be described in detail here. The calculator 5 comprises a keyboard 6 of an essentially conventional kind but it is also equipped with a check button 7 and a print button 8. The function and use of these buttons will be described in closer detail in the following. The calculator 5 also is formed with a slit 9 which is used for checking the credit card 10 of a customer. At the lower part of the calculator, connections are provided for one or several memory cards 11, 12 which form the electronic memory unit in accordance with the invention. Two memory cards have been chosen to illustrate the embodiment shown in the drawings, of which one card 11 comprises an information storage in which are stored data on restricted account numbers in conformity with one or several restricted cards lists and the second card 12 essentially is intended to contain data on the transactions performed over a predetermined period of time.

When a storekeeper or a cashier wishes to check a credit card 10 for validity he or she slides the card through the slit 9. The credit card number then appears in a display window 13 on the calculator 5. In the calculator 5 is carried out an electronic operation for comparison of the account number with the stored invalid-account numbers and if the credit card being checked is found among the invalid-status account numbers on the memory card 11 this fact is indicated for instance by the account number appearing in the display window 13 in a steady light shifting to a flashing light. Should the magnetic information on the account card 10 be damaged or otherwise illegible when the card is slid through the slit 9, the cashier may read the information visually from the credit card and manually key the credit account number into the apparatus by means of the numerical keyboard 6 and then press the check button 7. The visual indication of the result of the check for validity takes place as indicated above.

When the checked credit card 10 has proved to be valid, the customer may conclude his purchases and the prices thereof are added in the calculator 5. Simultaneously, the data on the transactions are stored on the memory card 12. The cashier or the storekeeper may then in the conventional way transfer the required information manually from the

credit card 10 as also other data, such as the date, the total sum of the purchases and other information appearing on credit card sales slips and of three copies thereof the customer receives one as a receipt of purchases made together with credit card 10 returned to him whereas the remaining two copies are placed in the cash register.

As an alternative, the calculator 5 can be connected electrically to a printer 14, as illustrated in Fig. 2. When all transaction data have been entered into the calculator 5 and the total amount appears in the display windows 13, the print button 8 is depressed and a credit card sales slip 15 is printed automatically. Quite apart from the fact that this method is quicker it is also safer because the numbers printed on the sales slip 15 are correct and easily legible.

After the closing time of the shop or store 16 a messenger 17 (see Fig. 3) takes the two memory cards 11 and 12 to the bank 18. The bank has a computer 19 which may be connected on-line with the credit card central 20. It is likewise possible to send a memory card 21 or a disc 22 containing the latest updated restricted cards list from the central 20 to the bank 18 at regular intervals, which data are entered into the computer 19. Both cards 11, 12 are fed individually into a terminal 23 which could be positioned either adjacent the bank´s conventional service box or which may be available inside the bank premises during bank service hours. The card 11 is updated with the data on the latest restricted account numbers, some account numbers perhaps being dropped while others are added. The transaction data stored on the card 12 are now transferred to the bank computer. These operations could, of course, be performed equally well by means of one single memory card 1 in accordance with Fig. 1, the decisive factor being the storage capacity of the memory card 1.

Several important advantages are gained by the novel system. Primarily, the job performed by the bank clerks is made more efficient since the clerks no longer need to enter business transaction data manually into the computer 19, reading the information from the bundles of customer sales slips 15 received from the shop or store. These now only serve as a customers´ receipt and as the shopkeepers´ and the credit card company´s check slip. Other important advantages are that at least when the bank has a direct line to the credit card cental 20 the shopkeeper 16 always has daily updated restricted cards list at his

disposal and that the validity check of the customers' credit cards 10 may be effected without such delays as were previously caused by having to check a lengthy printed restricted cards list or having to wait to get through on a telephone line to the credit card central 20. Instead, this check is now always performed by electronic equipment internally in the store or shop and therefore contacts with other systems are no longer required for checking purposes in order for a credit card business transaction to be effected correctly.

The novel handling system could be used with the same advantages in department stores and other large points of sale where a large number of cash registers are used. In this case each cashier feeds her memory card or cards 11 or 12 after the business hours into a terminal positioned in the premises for transfer of the data on the day's transactions and for updating of the restricted cards list. The terminal may be connected on-line with the store's bank.

The main unit 24 in accordance with the invention supplements the earlier described memory terminal and may be used together with the latter or as a separate unit together with already existing cashier terminals. However, the unit 24 must always be used together with other components incorporated in the system as it has no keyboard for entering input data. The main principle behind the unit 24 is, however, identical with that pertaining to the memory terminal just described and the system concept is the same.

The main unit 24 has been devised in order to allow already existing cash register systems to make use of the particular features which characterize the subject invention, i.e. an electronic system for credit card validity checks and collection of transaction data, which system provides an extensively simplified handling of credit cards tendered as means of payment.

The main unit 24 will be described in closer detail in the following with reference to Fig. 4. This drawing figure illustrates in a perspective view examples of how to connect the main unit 24 in a store or a shop which already has a cashier terminal 34 and a local computer installation 36 devised for bookkeeping operations, storage supervision and so on. The main unit 24 is coupled between the cashier terminal 34 and the computer 36. In this manner, the shop or store acquires a complete

system for credit card validity checks, transaction data collecting and printing of customer's credit card sales slips 15. The cashier terminal 34 could be an integrated intelligent terminal or else it could consist of a simple keyboard with matrix-coded key functions. The latter are generally used in supermarket cash registers where the keyboard is easily accessible to the cashier, often supported on an articulated arm structure allowing the cashier to work more efficiently.

The electronic main unit 24 has two outputs for two or more memory cards 11, 12. Preferably, cards of SRAM type are used in this instance for the reason that they provide the advantages outlined in the aforegoing. The unit 24 has built-in printers 14 which may print sales slips 15, a display window 17, four series inputs 25, 26, 27 and 28 for a card reader 9a and a direct input 29 to the printer 14. A parallel port, input 31, is provided for connection of external cashier register terminals 34 or matrix-coded keyboards (not shown) and a series port, output 30, is provided for connection to computer system 36, type PC, telephone modems or series cash registers.

When the cashier has entered all transaction data in her cashier terminal 34 and the customer indicates that he wishes to use his credit card 10 to pay for his merchandise, the cashier accepts the customer's card and slides it through the slit 9 in a card reader 9a. The box 24 checks electronically whether the account number associated with the card is found on one or the other of the memory cards 11 and 12 and within one second the customer's card number, his name and the validity of the card are shown in the display window 33 of the cash terminal 34. Should the customer's account number be restricted the cashier is immediately informed thereof since this information is clearly visible in the display window 33 and also a beep sound could be used for this purpose, should this be desired. The cashier may now act in accordance with predetermined instructions, depending on whether the card is reported stolen, has expired and so on. The data concerning the card number and other information could also appear in the display window 32 of the main unit 24.

When the credit card 10 is proven to be a valid one the customer may go through with the desired purchase transactions. The cashier then

presses a button, marked receipt or printer, on the keyboard 32 on her cashier terminal 34, and the printer 14 immediately prints a credit card sales slip 15, including two copies. The cashier hands the slip over to the customer for his signature in evidence of his acknowledge of the transaction.

Simultaneously with the cashier depressing the receipt button on her keyboard, all data on the transaction, viz. all data pertaining to the purchases, are transferred electronically directly to the memory card 11 or 12.

At the end of the day the shopkeeper may transfer all transaction data into his own computer system 36 for further processing, such as bookkeeping, storing and so on, and print out all transaction data either via the main unit 24 or the printer of the latter or via the ordinary computer printer, if such is available.

The main unit 24 can serve several cashiers, provided each one has her card reader 9a and the readers are connected to their individual one of inputs 25, 26, 27 and 28 on the box 24. In this case, the main unit 24 functions as a central unit which controls the credit cards 10 for validity, enters all transaction data onto the memory cards 11 or 12 and prints the customers´ sales slips 15. To interconnect the equipment in this manner may be advantageous, when a number of cash registers are positioned side by side behind a common cash register desk or the like.

The main unit 24 is not limited to the application outlined in the aforegoing but it could be adapted for connection to the individual storekeeper´s system and then provides the functions characterizing the invention. For instance, the memory unit could include a memory card the software of which is designed for a selected main unit or for a group of such units, such as control program, information/messages to displays and/or printers and data specific to the activities of the business using the main unit.

In addition, the main unit 24 could be connected directly to an already existing on-line-system as described above. In this case, the connection is made at the series output 30 on the main unit 24. When the cashier then uses her on-line apparatus to check credit cards 10 for validity the apparatus only needs to call the main units 24 and

immediately receives an answer from the latter regarding the status of the credit card in question. At the same time, all transaction data are registered on one of the memory cards, 11 or 12. In addition, the cashier receives a print of the sales slip 15. All these functions are now performed immediately, without the delays found in on-line systems.

CLAIMS

1. An electronic memory unit comprising a storage containing information to be used to check credit cards when the latter are being used as a means of payment, c h a r a c t e r i z e d therein that the memory unit (1; 11, 12) also comprises a memory space (4, 12) in which are successively stored data on the transactions performed over a predetermined period of time by means of credit cards (10), and also therein that the transaction data are electronically transferable from the memory unit (1; 11, 12) to a terminal (23) which is connected to a computer (9).

2. An electronic memory unit as claimed in claim 1, c h a r a c t e r i z e d therein that it consists of one single memory card (1) containing both the information storage (2) and the memory space (4) concerning the transactions, and in that the information storage (2) is updatable in connection with the electronic transfer of the transaction data to the terminal (9).

3. An electronic memory unit as claimed in claim 3, c h a r a c t e r i z e d therein that the unit is divided into two memory cards (11, 12), one (11) of which has a memory containing the information storage and the other one (12) a memory containing the transaction data.

4. An electronic memory unit as claimed in claim 1, c h a r a c t e r i z e d therein that in said memory unit a space (3) is reserved for information on the various types of credit cards that are accepted for checking.

5. A main unit for use together with the electronic memory unit (1, 11, 12) in accordance with claim 1, c h a r a c t e r i z e d therein that the main unit (24) is provided with one or several inputs (25, 26, 27, 28) to which are connected card readers (9a), one input (31) to which is connected a terminal, such as a cashier terminal (34), the latter being equipped with a keyboard (32), a printer (14) for printing credit card

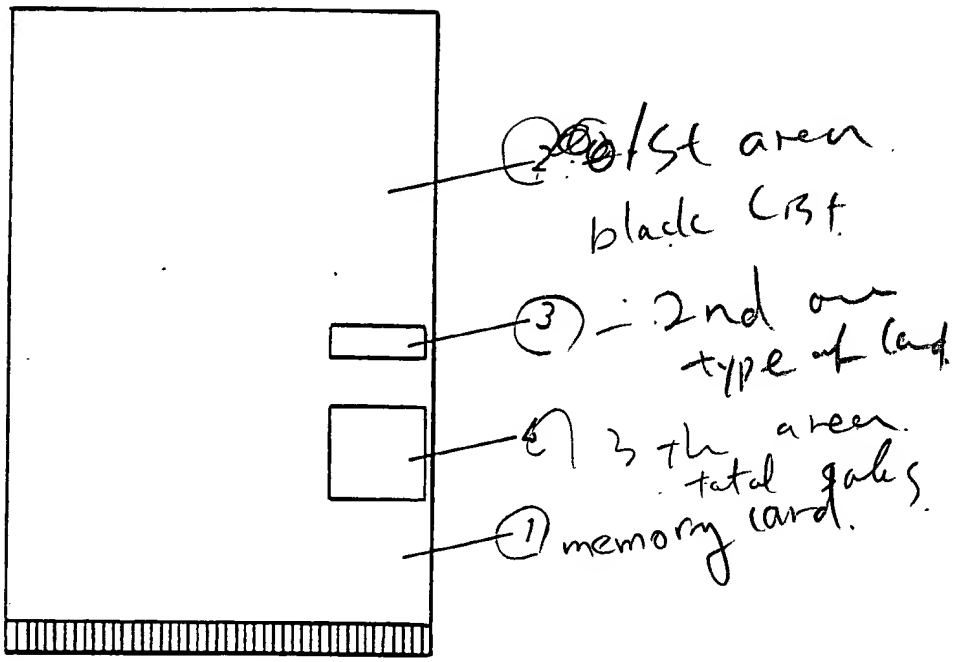
sales slips (15) on which are indicated the transactions made by means of credit cards (10), and electronic means to compare credit card account numbers read by the card reader means (9a) against data stored in the information storage (2) of the memory unit (1, 11, 12) as well as electronic means for successively entering data on the performed transactions into said memory space (4, 12) in the memory unit (1, 11, 12).

6. A main unit as claimed in claim 5, c h a r a c t e r i z e d therein that the main unit (24) has one output (30) for connection thereof to an internal computer (36), to a telephone modem or series cash registers.

7. A main unit as claimed in claim 5, c h a r a c t e r i z e d therein that it is provided with a display window (37) which is arranged to display both the account numbers pertaining to the credit cards being checked and the transactions performed by means of credit cards (10).

8. An electronic memory unit for use in a main unit of the kind defined in claims 5 - 7, c h a r a c t e r i z e d therein that the memory unit includes a memory card the software of which is designed for a selected main unit or for a group of such units, such as control program, information/messages to displays and/or printers and data specific to the activities of the business using the main unit.

Fig. 1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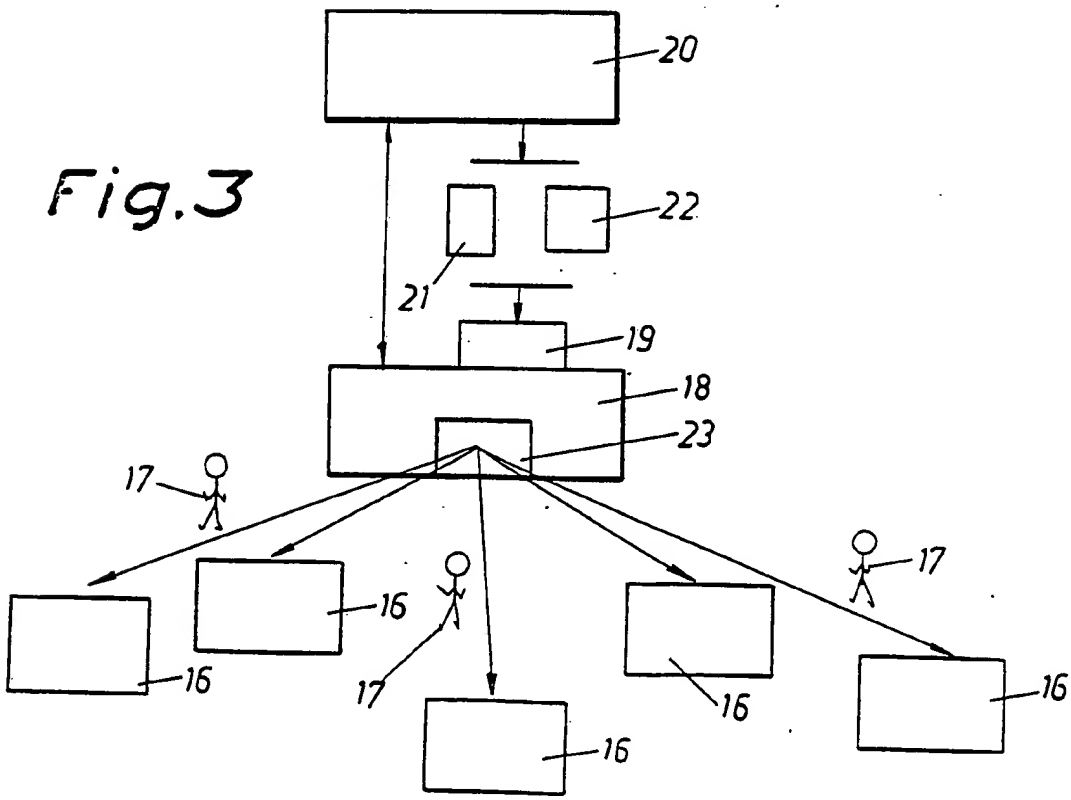
1 memory card.

Fig. 3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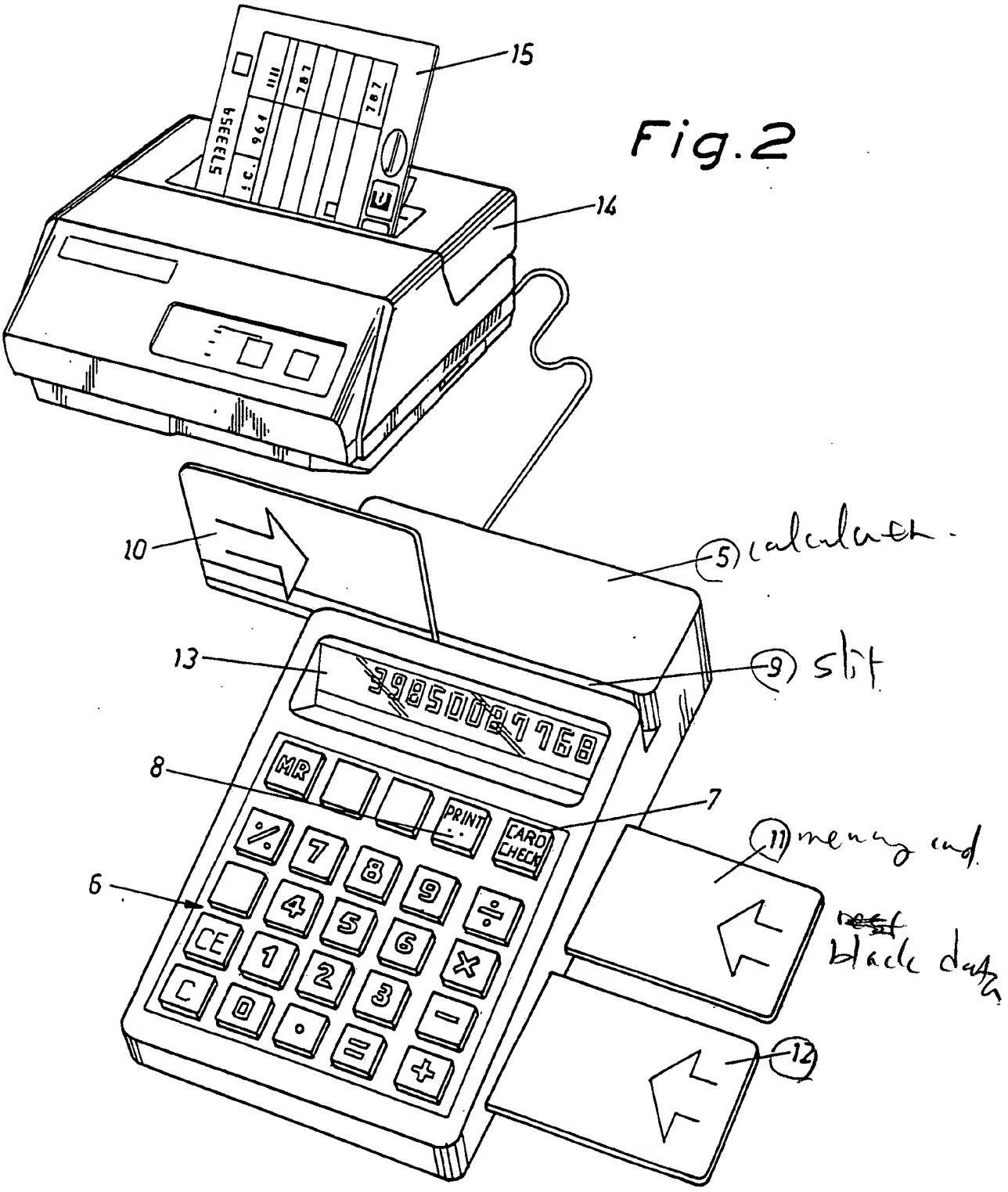

15
14
10
5) calculator
13
9) slit
8
MR
PRINT
CARD CHECK
7
11) memory card
6
CE
C
12
black data

Fig.2

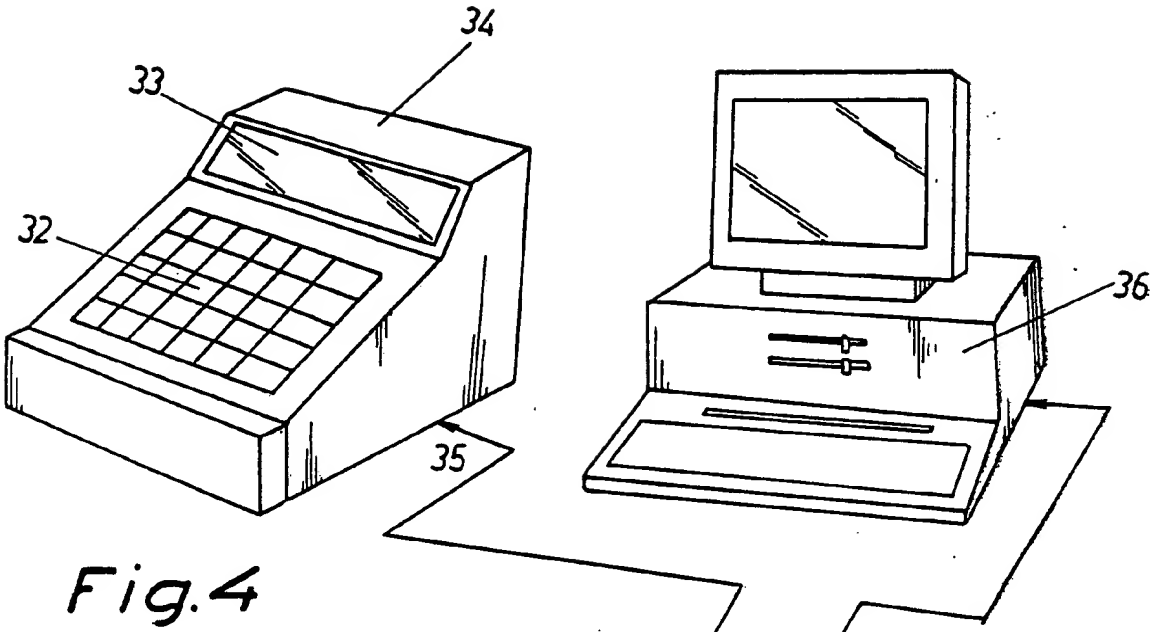
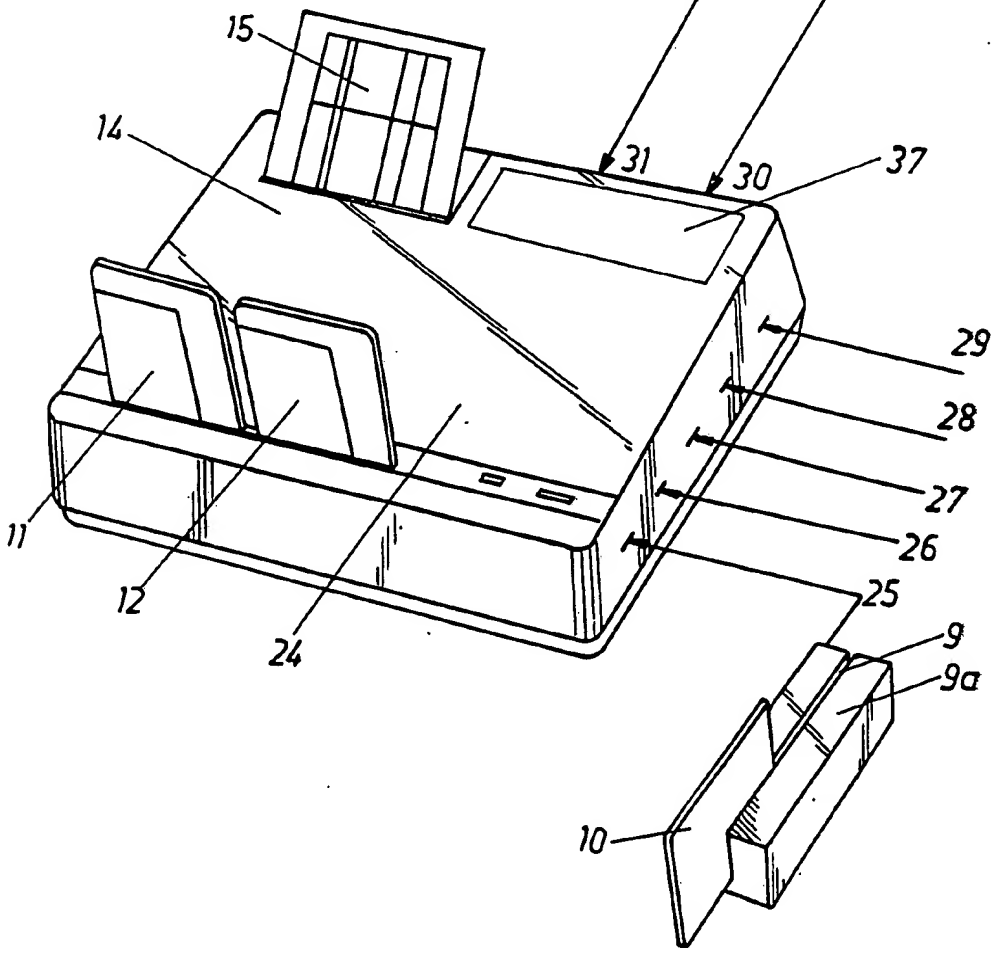


Fig.4



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 89/00380

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC4: G 07 C 11/00, G 07 F 7/08

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC4	G 07 C; G 07 F

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

SE, NO, DK, FI classes as above.

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	IEEE Spectrum, Vol. 21, No. 2, February 1984 (New York) Stephen B. Weinstein: "Smart credit cards: the answer to cashless shopping" , see page 43 - page 49 . especially page 45, right column. --	1-4
X	WO, A1, 86/07647 (VENTRONIC VENTURE ELECTRONICS AB) 31 December 1986, see page 2, line 36 - page 4, line 17; abstract --	5-8
X	EP, A2, 0254595 (TRINTECH LIMITED) 27 January 1988, see column 3, line 30 - column 4, line 29; abstract; claims 1-5 --	5-8
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* Special categories of cited documents: [10]

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"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1989-09-22	1989 -10- 02
International Searching Authority	**Signature of Authorized Officer**
Swedish Patent Office	Hans Bandelin

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/SE 89/00380

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A1- 86/07647	31/12/86	SE-A-	8503039	19/12/86
		SE-A-C-	448127	19/01/87
		EP-A-	0229101	22/07/87
EP-A2- 0254595	27/01/88	AU-D-	76133/87	28/01/88
		JP-A-	63080381	11/04/88